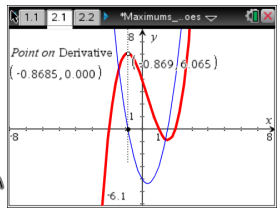
4.1 Extreme values of functions

local vs global extreme values

max & min

local: (relative) on a local neighborhood

global: (absolute) biggest (smallest) of them all



critical points, endpoints : candidates for max & min

1. $f' = 0$
2. f' = undefined
3. end pts

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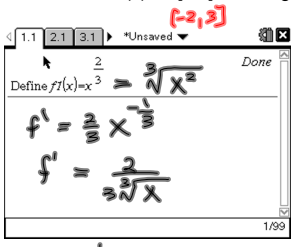
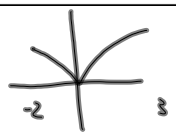
find extrema of f(x) on [-2,3]. Solve graphically and analytically





candidate list

1. $f'=0$ at $x=$? none
2. f' undefined at $x=0$ $y=0$
3. endpts $x=-2$ $y=\sqrt[3]{4}$ $x=3$ $y=\sqrt[3]{9}$

abs. max at $x=3$, is $y=\sqrt[3]{9}$

abs min at $x=0$ is $y=0$

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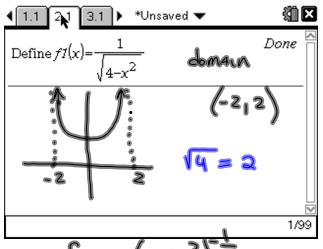
find extrema of f(x). Solve graphically and analytically



candidates

1. $f'=0$ at $x=0$ $y=\frac{1}{2}$
2. f' undef. at $x=2$ $x=-2$ not in domain of f
3. endpts none

$f = (4-x^2)^{-\frac{1}{2}}$

$f' = (-2x)(-\frac{1}{2})(4-x^2)^{-\frac{3}{2}}$

$f' = \frac{x}{\sqrt{(4-x^2)^3}}$

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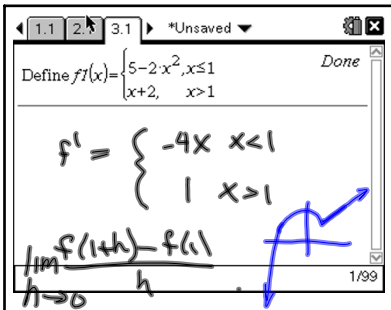

1. $f'=0$ at $x=0$ $y=5$
2. $f'=$ ✕ at $x=1$ $y=3$
3. endpts none

local max at $x=0$ is $y=5$

local min at $x=1$ is $y=3$

$f'(1)$ = undefined

lhd = -4 ≠ rhd = 1

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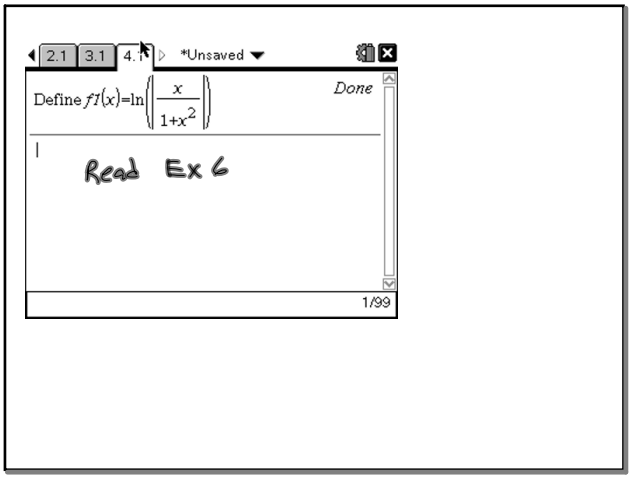
2.1
3.1
4.1
*Unsaved
Define $f1(x)=\ln\left(\frac{x}{1+x^2}\right)$
Done
Read Ex 6
1/99

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